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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,970	08/29/2006	Tsuyoshi Nishioka	0054-0323PUS1	5666

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EXAMINER	
BAUM, RONALD	
ART UNIT	PAPER NUMBER
2439	

NOTIFICATION DATE	DELIVERY MODE
04/27/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/590,970	NISHIOKA ET AL.	
	Examiner	Art Unit	
	RONALD BAUM	2439	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) *1-5* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-10* is/are rejected.

7)☒ Claim(s) *6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in reply to applicant's correspondence of 29 August 2006.

2. Claims 1-10 are pending for examination, with claims 1-5 canceled.

3. Claims 6-10 are rejected.

Claim Objections

4. Claim 6 is objected to because of the following informalities: the phrase "for multiplexing an causing interference" should read as "for multiplexing an**d** causing interference". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 6-10 are rejected under 35 U.S.C. 102(b) as being anticipated by HASEGAWA, T., et al, "An Experimental Realization of Quantum Cryptosystem", IEICE TRANSACTIONS on Fundamentals of Electronics, Communications and Computer Sciences, Vol.E85-A, No. l, 01 January, 2002 (01.01.02), pages 149 to 157 ("Hasegawa").

Prior Art's Broad Disclosure vs. Preferred Embodiments

As concerning the scope of applicability of cited references used in any art rejections below, as per MPEP § 2123, subsection R.5. Rejection Over Prior Art's Broad Disclosure Instead of Preferred Embodiments:

I. PATENTS ARE RELEVANT AS PRIOR ART FOR ALL THEY CONTAIN "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." In re Heck, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting In re Lemelson, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. Merck & Co. v. Biocraft Laboratories, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989). See also > Upsher-Smith Labs. v. Pamlab, LLC, 412 F.3d 1319, 1323, 75 USPQ2d 1213, 1215 (Fed. Cir. 2005)(reference disclosing optional inclusion of a particular component teaches compositions that both do and do not contain that component);< Celeritas Technologies Ltd. v. Rockwell International Corp., 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir. 1998) (The court held that the prior art anticipated the claims even though it taught away from the claimed invention.). >See also MPEP § 2131.05 and § 2145, subsection X.D., which discuss prior art that teaches away from the claimed invention in the context of anticipation and obviousness, respectively.<

II. NONPREFERRED AND ALTERNATIVE EMBODIMENTS CONSTITUTE PRIOR ART
Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. In re Susi, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). "A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." In re Gurley, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994). Furthermore, "[t]he prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed…." In re Fulton, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Hasegawa *generally* teaches and suggests (i.e., Summary, Sections 1-6, in general) the limitations set forth in the claims below.

6. As per claim 6; "A quantum cryptographic communication apparatus, characterized in that the apparatus comprises:

a quantum communication path

for transferring a quantum [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system /network communications paths, the optical fiber path ('... quantum communication path ...'; e.g., the figure 2 ' Optical Fiber ' [interfacing] element between the 'Alices Quantum Cryptographic Device ' to ' Bobs Quantum Cryptographic Device ' elements), the optical paths optical routing/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*];

a quantum transmitter apparatus

provided on a transmission side of

the quantum transfer path [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter ('... quantum transmitter ... path ...'; e.g., the figure 2 'Alices Quantum Cryptographic Device ' element)/receiver sides, electronic control system /network communications paths, the optical path, the optical paths optical routing/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*];

a quantum receiver apparatus

provided on a reception side of

the quantum transfer path [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver ('... quantum receiver ... path ...'; e.g., the figure 2 ' Bobs Quantum Cryptographic Device ' element) sides, electronic control system /network communications paths, the optical path, the optical paths optical routing/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*];

and

a control signal communication path

connecting the quantum transmitter apparatus with

the quantum receiver apparatus,

the control signal communication path

being used for communicating a control signal

containing a synchronization signal between

the quantum transmitter apparatus and

the quantum receiver apparatus, and in that [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system ('... control signal communication ...'; e.g., the figure 2 ' Ethernet ' and dashed line segment [interfacing] elements between the 'Alices Quantum Cryptographic Device ' to ' Bobs Quantum Cryptographic Device ' elements) /network communications paths, the optical path, the optical paths optical routing/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*]:

a quantum receiver apparatus comprises:

a light source serving as a quantum source [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing/detecting/generating ('... quantum receiver ... a light source ...'; e.g., the figure 2 ' Laser ' element of ' Bobs Quantum Cryptographic Device ' element) elements, clearly encompasses the claimed limitations as broadly interpreted by the examiner.*];

an optical path loop including

a multiplexing/interfering means

for generating time difference twin photon pulses

composed of both

a signal optical pulse and

a reference optical pulse from

a photon pulse outputted from the light

source and

for multiplexing an causing interference between

the signal optical pulse corresponding to

a retrograde quantum and

the reference optical pulse [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing ('... multiplexing/interfering means ... generating time difference ...'; e.g., the figure 2 ' Short arm ' , ' Long arm ' and associated optical path elements of the ' Bobs Quantum Cryptographic Device ' element) /detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*];

a bypass optical path including

a phase modulator

which is provided at a port

connected to the quantum communication path, and

phase-modulates

only the reference optical pulse

received after the time difference twin photon pulses

are reciprocated

via the quantum communication path between

the quantum transmitter apparatus and

the quantum receiver apparatus [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing ('... phase modulator ... reference optical pulse ...'; e.g., the figure 2 ' Short arm '/' Long arm ' optical path ' PMB ' element of the ' Bobs Quantum Cryptographic Device ' element) /detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*]; and

a photon detector

for monitoring interference light passed through the optical path loop

[*figure 2 and associated description, whereas the schematic of the QC inclusive of*

the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.; '... photon detector ...'; e.g., the figure 2 ' Short arm '/' Long arm ' optical path ' APD1 ' and ' APD2 ' elements of the ' Bobs Quantum Cryptographic Device ' element), clearly encompasses the claimed limitations as broadly interpreted by the examiner.];

the quantum transmitter apparatus comprises:

a polarized wave rotating means for

rotating polarization planes of the twin photon pulses

at a right angle in a non-reciprocal manner,

the twin photon pulses having reached thereto

from the quantum receiver apparatus

via the quantum communication path [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing/detecting elements (i.e., polarization beam splitters, photon detectors, rotating mirrors, etc.; '... polarized wave rotating means ...'; e.g., the figure 2 optical path ' A ' , ' PBS ' and ' C2 ' elements of the ' Alices Quantum Cryptographic Device ' element), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*];

a phase modulator for

phase-modulating a signal optical pulse

passes through the polarized wave rotating means and

returning the signal optical pulse

to the quantum receiver apparatus

through the quantum communication path

so as to return the phase-modulated signal optical pulse

to the quantum receiver apparatus [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing/detecting elements ('... phase modulator ... passes through ... returning the signal ...'; e.g., the figure 2 optical path ' PMA ' element of the ' Alices Quantum Cryptographic Device ' element), clearly encompasses the claimed limitations as broadly interpreted by the examiner.*]; and

a beam attenuating means for

attenuating the signal optical pulse

such that the signal optical pulse includes

less than two photons in the pulse [*figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network*

communications paths, the optical path, the optical paths optical routing/detecting elements ('... phase modulator ... passes through ... returning the signal ...'; e.g., the figure 2 optical path ' A ' element of the ' Alices Quantum Cryptographic Device ' element), clearly encompasses the claimed limitations as broadly interpreted by the examiner.].".

7. Claim 7 ***additionally*** recites the limitation that; "The quantum cryptographic communication apparatus according to claim 6, characterized in that:

the bypass optical path is provided with

a polarization beam splitter,

the polarization beam splitter

being provided at a branch point between

a transmission optical path and

a reception optical path of the bypass optical path; and

the polarization beam splitter allows,

in a case where

the polarization plane of

the signal optical pulse of the twin photon pulses

is equal to the polarization plane of

the reference optical pulse thereof,

only a fed-back photon pulse

to pass through the reception optical path

in which the phase modulator is provided.".

The teachings of Hasegawa are directed towards such limitations (figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing ('… a polarization beam splitter … between … optical path … only a fed-back photon pulse … to pass through the reception …'; e.g., the figure 2 ' Short arm '/' Long arm ' optical path ' PBS ' and ' PMB ' elements associated description of the ' Bobs Quantum Cryptographic Device ' element)/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompassing the claimed limitations as broadly interpreted by the examiner, and thereby not patently distinguishing the claim over the prior art.).

8. Claim 8 ***additionally*** recites the limitation that; "The quantum cryptographic communication apparatus according to claim 6, characterized in that

a polarization modulator

is provided between

the optical path loop and

the bypass optical path,

the polarization modulator serving to align,

in a case

where the polarization plane of

the signal optical pulse of the twin photon pulses

is different from the polarization plane of

the reference optical pulse thereof,

the polarization planes of the twin photon pulses

to match with each other in a going path

by rotating the polarization plane of the signal optical pulse

only when the signal optical pulse passes

therethrough.".

The teachings of Hasegawa are directed towards such limitations (figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing ('… a polarization modulator … between … optical path loop … bypass … serving to align … polarization plane … different … polarization planes of the twin photon pulses … rotating … '; e.g., the figure 2 ' Short arm '/' Long arm ' optical path ' PBS ', 'C1 ', ' C2 ' and ' PMB ' elements associated description of the ' Bobs Quantum Cryptographic Device ' element)/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompassing the claimed limitations as broadly interpreted by the examiner, and thereby not patently distinguishing the claim over the prior art.).

9. Claim 9 ***additionally*** recites the limitation that; "The quantum cryptographic communication apparatus according to claim 7, characterized in that

the polarization beam splitter includes

two sets of 1.times.2 input/output type polarization beam splitters

for guiding only a photon pulse

having a specific polarization plane

to the reception optical path

in which the phase modulator is provided.".

The teachings of Hasegawa are directed towards such limitations (figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing ('… polarization beam splitter … two sets of 1.times.2 input/output type … splitters … optical path … '; e.g., the figure 2 ' Short arm '/' Long arm ' optical path ' PBS ' and ' PMB ' elements associated description of the ' Bobs Quantum Cryptographic Device ' element)/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompassing the claimed limitations as broadly interpreted by the examiner, and thereby not patently distinguishing the claim over the prior art.).

10. Claim 10 ***additionally*** recites the limitation that; "The quantum cryptographic communication apparatus according to claim 7, characterized in that

the polarization beam splitter includes

one set of 2.times.2 input/output type polarization beam splitter

for guiding only a photon pulse

having a specific polarization plane

to the reception optical path

in which the phase modulator is provided.".

The teachings of Hasegawa are directed towards such limitations (figure 2 and associated description, whereas the schematic of the QC inclusive of the transmitter/receiver sides, electronic control system/network communications paths, the optical path, the optical paths optical routing ('… polarization beam splitter … one set of 2.times.2 input/output type … splitter … optical path … '; e.g., the figure 2 ' Short arm '/' Long arm ' optical path ' PBS ' and ' PMB ' elements associated description of the ' Bobs Quantum Cryptographic Device ' element)/detecting elements (i.e., polarization beam splitters, rotating mirrors, photon detectors, etc.,), clearly encompassing the claimed limitations as broadly interpreted by the examiner, and thereby not patently distinguishing the claim over the prior art.).

Conclusion

11. Any inquiry concerning this communication or earlier communications from examiner should be directed to Ronald Baum, whose telephone number is (571) 272-3861, and whose unofficial Fax number is (571) 273-3861 and unofficial email is Ronald.baum@uspto.gov. The examiner can normally be reached Monday through Thursday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad, can be reached at (571) 272-7884. The Fax number for the organization where this application is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. For more information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ronald Baum

Patent Examiner

/R. B./

Examiner, Art Unit 2439

/Edan Orgad/

Supervisory Patent Examiner, Art Unit 2439